PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference ACA 6276 WO	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/EP 03/10208	International filing date *(day/month/year)* 11.09.2003	Priority date *(day/month/year)* 18.09.2002
International Patent Classification (IPC) or both national classification and IPC C22B1/242		
Applicant AKZO NOBEL N.V. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
01.03.2004	27.12.2004
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Bjoerk, P Telephone No. +49 89 2399-8452

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP 03/10208

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-21 as originally filed

Claims, Numbers

1-6 received on 04.12.2004 with letter of 01.12.2004

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-4
	No:	Claims	5-6
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-6
Industrial applicability (IA)	Yes:	Claims	1-6
	No:	Claims	

2. Citations and explanations

see separate sheet

1. The present application relates to a process for making iron oxide-containing pellets characterized in that the binder system is substantially free of hydrophobic liquid and comprises an organic binder together with a binder additive selected from boron-containing compounds and calcium fluoride.

   The obtained pellets show an improved preheat strength.

2. The originally filed claims related to a binder system comprising "an inorganic binder and/or an organic binder" whereas in the present version, the inorganic binder has been removed. It is however noted that through the use of the word "comprises", the additional presence of some inorganic binder is not excluded from the scope of claim 1.

3. Reference is made to the following documents:
   D1: DATABASE WPI Section Ch, Week 199024 Derwent Publications Ltd., London, GB; Class J01, AN 1990-182909 -& SU 1 502 640 A (BAIKOV METALLURGY INST) 23 August 1989 (1989-08-23)
   D2: DATABASE WPI Section Ch, Week 200323 Derwent Publications Ltd., London, GB; Class A97, AN 2003-230211 -& CN 1 153 218 A (UNIV BEIJING SCI & TECH) 2 July 1997 (1997-07-02)
   D3: DATABASE WPI Section Ch, Week 199802 Derwent Publications Ltd., London, GB; Class M24, AN 1998-009746 & CN 1 133 345 A (ZHU C) 16 October 1996 (1996-10-16)
   D4: WO 99/60175 A (MOODY JOHN RUTHERFORD ;INTERBLEND INVESTMENTS PROPRIE (ZA)) 25 November 1999 (1999-11-25)

4. D1 discloses the production of pellets made by mixing iron ore with silica and variable amounts of B_2O_3 and firing the pellets at 1300°C. The addition of B_2O_3 leads to a strengthening of the pellets (abstract).

   D2 discloses in the title iron ore pellets whereas the abstract describes iron ore briquettes comprising iron ore, bentonite, carboxymethyl cellulose, boric acid, boronic clay, cement and feldspar (abstract). Carboxymethyl cellulose is an organic binder and boric acid a boron-containing compound.

   D3 discloses iron ore pellets composed of iron ore, coal powder and a binder. The binder may comprise MgO, silica powder, $MgCl_2$, iron-slag and calcium fluoride (abstract).

D4 discloses a method of conglomerating a mineral in granular state comprising as a binder at least sodium silicate, acrylic resin, vinyl alcohol and an effective amount of boron containing compound as an accelerator, beside magnesium salt and an anti-oxidant (claim 1). The boron containing compound may be borax (page 2, line 7). D4 mentions chrome ores as the mineral to be conglomerated. As indicated in the present application on page 11, chromite contains iron oxides.

5. As the pellets in D1 and D3 do not contain an organic binder, novelty over each of the disclosures of D1 and D3 can be recognized for the subject matter of claims 1 to 6 (Art.33(2) PCT).

6. Regarding the disclosure of D2, it is not excluded that this document does relate to pellets although it may be argued that the bulk of the abstract speaks of briquettes. Only a full translation of D2 from Chinese can clearly establish whether briquettes or pellets are described in this prior art document. It is noted that the table 3 on page 5 of D2 lists temperatures of 1150-1200°C, which could be an indication of heating of green pellets.

   Assuming that D2 does relate to pellets then it is noted that D2 does not indicate any heating temperature in the abstract and that the temperatures in table 3 of 1150-1200°C lie below the presently claimed range of 1275-1350°C. However, a heating in the range of "about 1275-1350°C" corresponds to the standard firing step of green pellets containing iron oxide. Consequently, no inventive step is seen in this temperature range vis-à-vis the disclosure of D2. The subject matter of claims 1, 2 and 4 does therefore not fulfill the requirements of inventive step of Art.33(3) PCT in view of D2.

   Independent process claim 5 does not indicate any temperature range. D2 describes the process step of claim 5, in particular a binder system comprising a cellulose ether and a boron-containing compound. Furthermore, it specifies that the cellulose ether is carboxymethyl cellulose as claimed in dependent claim 6.

   If the disclosure of D2 relates to pellets as indicated in the title then this document is novelty destroying to the subject matter of claims 5 and 6 (Art.33(2) PCT).

7. The specific choice of sodium borate of claim 3 is known from D4 as borax is a sodium borate. The combination of this choice of binder additive with the process of D2 is seen as obvious as both documents aim at improving the strength of iron

oxide containing pellets (Art.33(3) PCT).

8. It is noted that the application does not use SI units (Rule 10.1(a) PCT).

It is also noted that the description has not been adapted to the amended wording of claim 1, in particular on page 6, line 17 and page 8, lines 26-29.

CLAIMS

1. (amended) A process for producing iron oxide-containing pellets comprising agglomerating fine ore particles in the presence of a binder system to form green pellets, and heating said green pellets in stages to a final temperature in the range of about 1,275-1,350°C, characterized in that said binder system is substantially free of hydrophobic liquid and comprises
   (i) an organic binder, and
   (ii) a binder additive selected from boron-containing compounds, calcium fluoride, and combinations thereof.

2. The process according to claim 1 wherein the boron-containing compound is selected from boron oxide, calcium borate, sodium borate, boric acid, and boron nitride.

3. The process of claim 1 or 2 wherein the boron-containing compound is sodium borate.

4. The process according to any one of the preceding claims wherein the binder system comprises a carboxymethyl cellulose as organic binder.

5. A process for producing iron oxide-containing pellets comprising the step of agglomerating fine iron ore particles in the presence of a binder system which comprises a cellulose ether and a binder additive selected from boron-containing compounds, calcium fluoride, and combinations thereof.

6. The process according to claim 5 wherein the cellulose ether is carboxymethyl cellulose or a salt thereof.

Claims:

1. A process for producing iron oxide-containing pellets comprising agglomerating fine ore particles in the presence of a binder system to form green pellets, and heating said green pellets in stages to a final temperature in the range of about 1,275-1,350°C, characterized in that said binder system is substantially free of hydrophobic liquid and comprises
   (ii) an inorganic binder and/or an organic binder, and
   (iii) a binder additive selected from boron-containing compounds, calcium fluoride, and combinations thereof.

2. The process according to claim 1 wherein the boron-containing compound is selected from boron oxide, calcium borate, sodium borate, boric acid, and boron nitride.

3. The process of claim 1 or 2 wherein the boron-containing compound is sodium borate.

4. The process according to any one of the preceding claims wherein the binder system comprises a carboxymethyl cellulose as organic binder.

5. A process for producing iron oxide-containing pellets comprising the step of agglomerating fine iron ore particles in the presence of a binder system which comprises a cellulose ether and a binder additive selected from boron-containing compounds, calcium fluoride, and combinations thereof.

6. The process according to claim 5 wherein the cellulose ether is carboxymethyl cellulose or a salt thereof.